County and numerous forms of it were collected from typical material to one collection which very closely approached *P. heterophyllum* Bosc (*P. columbianum* Scribn.).

PANICUM UMBROSUM Le Conte (*P. Ashei* Pearson). This species was collected once more and was fairly plentiful in the locality. No. 480, among boulders back of rocky coast, near Dana's Beach, Manchester, Oct. 1, 1912.

Additions to previous list of species collected in Essex County; noting specimens in the Gray Herbarium or the Herbarium of the New England Botanical Club or where there are published records of the species from Essex County.

P. Lindheimeri Nash.

P. meridionale Ashe.

P. heterophyllum Bosc var. *thinium* (Hitchc. & Chase) Hubbard.

P. latifolium L. N. E. Bot. Club; Robinson, Fl. Essex Co. 130 (1880)

CAMBRIDGE, MASSACHUSETTS.

THE VARIATIONS OF LUZULA CAMPESTRIS IN NORTH AMERICA.

M. L. FERNALD and K. M. WIEGAND.

THE cosmopolitan species, *Luzula campestris* (L.) DC., has been treated by Buchenau [1] as consisting of twenty geographical varieties and by him has been kept apart specifically from the American *L. comosa* Meyer. In the study of certain collections from northeastern America, however, the writers, who have found it necessary to organize the material of these two species in the Gray Herbarium and during the prosecution of this study have been kindly loaned the local collection of the Academy of Natural Sciences of Philadelphia, have found it impossible to maintain any real specific lines between these two plants. In this failure to find specific lines between *L. campestris* and *L. comosa* they have arrived at the conclusion which has already been reached by several other students, for example Otto Kuntze [2]

[1] Buchenau in Engler, Pflanzenf. iv. Fam. 36, 83–95 (1906).

[2] Kuntze, Revis. Gen. Pl. ii. 724 (1891).

and C. V. Piper.[1] The characters used by Buchenau and others to separate *L. comosa* from *L. campestris* are the elongate spikes, frondose bracts, more ciliate bractlets and prophylla, and larger and more denticulate perianth segments. But in many specimens from the Northwest which are otherwise good *L. comosa* the spikes are subglobose; and more or less cylindrical spikes are frequently seen in *L. campestris*, var. *multiflora*, while they are made the basis of *L. campestris*, var. *calabra* (Ten.) Buch. In many plants otherwise *L. comosa* the bracts are short and slender while in *L. campestris*, var. *frigida*, as described by Buchenau, we find "inflorescentia composita, saepe a bracteis 1 vel 2 frondosis rigidis superata"; and similar frondose bracts occur occasionally in *L. campestris*, vars. *alpina* and *multiflora*. The ciliation of the bractlets and prophylla proves to be highly variable in both *L. comosa* and *L. campestris* without any clear line of demarcation between. Extreme specimens of *L. comosa* do indeed have large flowers, but the examination of a large suite of specimens shows that in the two so-called species the measurements overlap so frequently that no real line can be drawn between them. Extreme *L. comosa* would seem to be simply a stage larger in size of flower just as *L. campestris*, var. *multiflora* is a stage larger than *L. campestris*, var. *pallescens*.

Although the color of the perianth or capsule has frequently been considered of taxonomic importance, it is highly variable and often seems to be directly modified by the intensity of the light, being brownish in the more exposed situations and extremely pale in the woods. In the more boreal and alpine habitats, however, the color is, as would be expected, very intense, usually dark-chestnut to blackish, and this tendency, accompanied by a shortening or suppression of the rays, distinguishes such plants as *L. campestris*, vars. *alpina* (*sudetica*), *frigida* and *congesta* which, having fairly well marked geographical ranges, are maintained as varieties.

The size of the seed and the length of the caruncle have sometimes been used in separating plants of the *campestris* series, but after an examination of the seeds of the plants said to have pronounced differences in these characters it has seemed to the writers that the differences are slight and apparently not constant. The varieties with the smallest flowers, *L. campestris*, var. *pallescens* for instance, naturally have their seeds smaller than do the large-flowered plants, but the

[1] Piper, Contrib. U. S. Nat. Herb. xi. 186 (1906).

differences are so slight as to be difficult to use except in actual comparison of large series of specimens.

In organizing the North American material the writers have found the following key to the varieties of *L. campestris*, based largely on Buchenau's treatment, of service. The measurements of the length of the perianth, which form the primary basis of division, have been made by the writers from the specimens they have examined, and, although the sizes of the flowers overlap, as would be expected in such a polymorphous species, the varieties recognized all seem to be definite geographic trends of the species.

A. Plant stoloniferous: inflorescence loose: flowers of medium size (3 mm. long): Eurasian.....1. *L. campestris* (typical).

A. Plants caespitose. B.

B. Perianth large (5–6.5 mm. long): heads globose to cylindric, 1–2 cm. long: inflorescence loose.....2. var. *macrantha*.

B. Perianth of medium size (2.5–4.5 mm. long). C.

C. Perianth 3–4.5 mm. long, equaling or exceeding the capsule: heads cylindrical, rarely globose, the longer 10–30 mm. long: inflorescence loose or somewhat congested.....3. var. *comosa*.

C. Perianth 3.5–4 mm. long, usually much exceeding the capsule; inflorescence with no obvious rays.....4. var. *congesta*.

C. Perianth (2.8–)3–4 mm. long, usually exceeding the capsule: heads hemispherical to short-cylindrical, 3–9 mm. long, mostly on unequal rays; some short rays strongly divergent.....5. var. *echinata*.

C. Perianth 2.4–3.3 mm. long, slightly or not at all exceeding the capsule: heads globose or short-cylindrical, 4–11 mm. long, on mostly ascending rays. D.

D. Perianth and capsule pale, ferruginous or moderately castaneous: inflorescence lax or rarely congested.

Base of plant rarely producing bulblets: perianth 2.5–3.3 mm. long.....6. var. *multiflora*

Base of plant commonly producing bulblets: perianth 2-2.5(–3) mm. long.....8. var. *bulbosa*.

D. Perianth and capsule intensely castaneous or almost black: inflorescence usually congested.....7. var. *frigida*.

B. Perianth small (1.8–2.3 mm. long).

Inflorescence lax to somewhat dense: perianth and capsule pale to moderately castaneous.

Base of plant copiously bulblet-bearing: perianth 2–2.3(–3) mm. long.....8. var. *bulbosa*.

Base of plant not bulblet-bearing: perianth 1.8–2.3 mm. long. 9. var. *pallescens*.

Inflorescence dense: perianth and capsule intensely castaneous or almost black.....10. var. *alpina*.

1. L. CAMPESTRIS (L.) DC. Fl. Franc. iii. 161 (1805). *Juncus campestris* L. Sp. Pl. 329, in part (1753). *L. campestris*, var. *vulgaris* Gaudin, Fl. Helv. ii. 572 (1828); Buchenau in Engler, Pflanzenr. iv. Fam. 36, 86 (1906), which see for fuller synonymy. *Juncodes campestre* O. Ktze. Revis. Gen. Pl. ii. 724 (1891). *Juncoides campestre* Coville, Contrib. U. S. Nat. Herb. iv. 208 (1902).— Eurasia. Said by Buchenau to occur in northwestern America.

2. Var. **macrantha** (Watson), n. comb. *L. comosa*, var. *macrantha* Watson, Bot. Cal. ii. 203 (1880). *Juncoides comosum*, var. *macrantherum* Parish, Erythea, iii. 59 (1895). *Juncoides comosum*, var. *macranthum* Howell, Fl. N. W. Am. i. 681 (1903).— CALIFORNIA: the specimens originally labelled *L. comosa*, var. *macrantha* by Watson were from Plumas County, May, 1877, *Mrs. R. M. Austin;* dry hills southeast of Mt. Diablo, May 23, 1860–62, *Brewer*, no. 1148; Big Trees, May, 1860–62, *Brewer*, no. 2335. A plant with extremely large flowers (6.5 mm. long) and a well-developed bulb borne on a short stolon comes from Placer County (*Mrs. M. E. P. Ames*). Parish reports the plant southward to San Bernardino County.

3. Var. **comosa** (Meyer) n. comb. *L. comosa* Meyer, Synop. Luz. 21 (1823); Watson, Bot. Cal. ii. 202 (1880); Buchenau in Engler, Pflanzenr., iv. Fam. 36, 83 (1906). *Juncodes campestre*, var. *comosum* O. Ktze. Revis Gen. Pl. ii. 724 (1891). *Juncodes comosum* Sheldon, Minn. Bot. Stud. i. 64 (1894). *Juncoides comosum* Parish, Erythea, iii. 59 (1895). *Juncoides campestre*, in part, of Piper, Cont. U. S. Nat. Herb. xi. 186 (1906). *L. comosa*, var. *subsessilis* Watson, Bot. Cal. ii. 203 (1880). *Juncodes comosum*, var. *subsessilis* [*e*] Sheldon, Minn. Bot. Stud. i. 64 (1894). *Juncoides comosum*, var. *subsessile* Howell, Fl. N. W. Am. i. 681 (1903). *L. subsessilis* Buchenau, Öster bot. Zeitschr. xlviii. 290 (1898) and in Engler, l. c. 68 (1906). *L. comosa*, var. *laxa* Buchenau in Engler, l. c. 83 (1906) — Northeastern Asia (COPPER ISLAND) and ALASKA to southern CALIFORNIA. Also Newfoundland and eastern Quebec. NEWFOUNDLAND: Baccalieu Island, Notre Dame Bay, July 2, 1902, *Sornborger;* open river-flat, Glenwood, July 12 & 13, 1911, *Fernald and Wiegand*, no. 5163; sandy and gravelly banks, Whitbourne, August 8, 1911, *Fernald and Wiegand*, no. 5168. QUEBEC: sterile meadow, Douglastown, Gaspé Co., August 21 & 22, 1904, *Collins, Fernald & Pease.*— Without extended field knowledge of the variations here included it seems very unwise to separate from var. *comosa* vars. *subsessilis* and *laxa*, which, judging from the abundant transitional material in the herbarium seem to be mere states of one plant. The varietal name *comosa* is here retained in its aggregate sense.

4. Var. CONGESTA (Thuill.) Meyer. Synop. Luz. 18 (1823); Duby in DC. Bot. Gal. ed. 2, i. 479 (1828); Buchenau, Mon. Junc. 162 (1890) and in Engler, l. c. 91 (1906), which see for detailed synonymy. *Juncus campestris* ζ. L. Sp. Pl. 330 (1753). *Juncus congestus* Thuill. Fl. Par. ed. 2, 179 (1799). *L. comosa*, var. *congesta* Watson, Bot. Cal.

ii. 203 (1880). *Juncodes comosum*, var. *congestum* Sheldon, Minn. Bot. Stud. i. 64 (1894). *Juncoides comosum*, var. *congestum* Howell, Fl. N. W. Am. 681 (1903).— Europe and Eastern Asia. In North America from VANCOUVER ISLAND to CALIFORNIA.

5. Var. **echinata** (Small), n. comb. *Juncoides echinatum* Small, Torreya, i. 74 (1901). *Luzula campestris*, var. *bulbosa* Robinson & Fernald in Gray Man. ed. 7, 279 (1908) in part, not Wood.—NEW JERSEY and PENNSYLVANIA to GEORGIA and TEXAS.

6. Var. MULTIFLORA (Ehrh.) Čelak. Prodr. Fl. Böhem. 85 (1869); Buchenau in Engler, l. c. 94 (1906) which see for detailed synonymy; Robinson & Fernald in Gray Man. ed. 7, 279 (1908). *Juncus campestris* γ, L. Sp. Pl. 329 (1753). *Juncus multiflorus* Ehrh. Calam. Gram. et Tripet. exsicc. (about 1791); Retz. Fl. Scand. Prodr. ed. 2, 82 (1795). *Cyprella campestris*, var. *multiflora* MacMillan, Met. Minn. Val. 142 (1892). *Juncodes campestre*, var. *multiflorum* Sheldon, Minn. Bot. Stud. i. 65 (1894).— Eurasia and North America. In North America the most widely distributed plant, occurring from NEWFOUNDLAND to ALASKA, south to NEW JERSEY, PENNSYLVANIA, ILLINOIS, UTAH and CALIFORNIA; abundant northeastward, rare westward.

7. Var. FRIGIDA Buchenau, Öster. bot. Zeitschr. xlviii. 284 (1898), and in Engler, l. c. 93, fig. 55 (1906); Robinson & Fernald in Gray Man. ed. 7, 279 (1908).— Boreal, arctic and alpine Eurasia. In North America from GREENLAND and LABRADOR to NEWFOUNDLAND, southern NEW BRUNSWICK and eastern MAINE; islands of BERING SEA.

8. Var. BULBOSA Wood, Class Book (1861) 723; Robinson & Fernald in Gray Man. ed. 7, 279 (1908) in part. *Juncoides bulbosum* Small, Torreya, i. 75 (1901).— Dry open sandy woods and thickets or serpentine barrens, NEW JERSEY and southeastern PENNSYLVANIA to GEORGIA (*Small*), west KANSAS and TEXAS.— The production of bulblets, though more general in this variety than in the others, is by no means confined to it. They occur occasionally in vars. *macrantha*, *comosa*, *congesta*, and *multiflora* in America and in some of the European and Australian varieties as well as in various species of *Juncus* which ordinarily lack bulblets (see Buchenau, Flora, lxxiv. 77 (1891)). In its inflorescence var. *bulbosa* strongly simulates var. *pallescens* which, however, tends to have somewhat smaller flowers; but in the specimens which are transitional in the size of flowers the presence or absence of bulblets alone seems to distinguish the plants.

9. Var. PALLESCENS Wahlenb. Fl. Suec. i. 218 (1824); Buchenau in Engler, l. c. 88 (1906) which see for fuller synonymy. *Juncus campestris* β. L. Sp. Pl. 329 (1753). *Juncus pallescens* Wahlenb. Fl. Lapp. 87 (1812). *L. pallescens* Besser, Enum. Pl. Volh. Pod. 15 (1822). —Eurasia. In North America known only from NEWFOUNDLAND and the Gaspé Peninsula of QUEBEC, but, since it occurs on islands on the Asiatic side of Bering Sea, to be expected from the Alaskan islands. NEWFOUNDLAND: open fields near the Gander River, Glenwood, July 12 & 13, 1911, *Fernald & Wiegand*, nos. 5160, 5161. QUEBEC: sterile

meadow, New Richmond, July 28–August 1, 1904, *Collins, Fernald & Pease*, July 16 and 17, 1905, *Williams, Collins, & Fernald;* steep slide on the East Branch of Little Cascapedia River, July 29 and 30, 1904, *Collins, Fernald & Pease;* sterile meadow near Giroux Station, Maria, July 11, 1905, *Collins & Fernald*, no. 54.— Hooker (Fl. Bor.-Am. ii. 188) cites var. *pallescens* from "Lake Winnipeg, to the Saskatchewan, and prairies and Lake of the Woods, Rocky Mountains. *Drummond*," but his description does not indicate whether he had the small-flowered plant or merely var. *multiflora*.

Var. ALPINA Gaud. Agrostol. Helv. ii. 247 (1811). *Juncus campestris* η. L. Sp. Pl. 330 (1753). *Juncus sudeticus* Willd. Sp. Pl. ii. 221 (1799). *Luzula sudetica* DC. Fl. Fr. vi. 306 (1815). *Luzula campestris*, var. *sudetica* Čelak, Prod. Fl. Böhm. 749 (1881); Buchenau in Engler, l. c. 89 (1906), which see for fuller synonymy. *Juncoides campestre sudeticum* Coville, Contrib. U. S. Nat. Herb. iv. 208 (1893). — Alpine and subarctic regions of Eurasia. Little known in North America: the only material seen by us comes from Fullerton, lat. 63°, 57′, northwest coast of HUDSON BAY, *J. M. Macoun*, no. 79,215. Coville and Funston's no. 1553 from near Mineral King, California, has been referred here, but the material in the Gray Herbarium, though too young for definite determination, has, even in its immature state, perianths longer than in var. *alpina* and the plant may be an extremely dwarfed state of var. *congesta*.

NOTES ON EUPHORBIA CYPARISSIAS L.— While returning after a day spent collecting in and about West Haven, Connecticut, June 23, 1912, in company with Mr. C. H. Bissell and Mr. R. W. Woodward, we crossed an open corner lot by a path used as a short cut to a near-by trolley line. This lot was quite thickly covered with *Euphorbia Cyparissias* L. Remarking that it looked strange I picked several plants and found they were heavily fruited and on further inspection the whole lot was found to be in full fruit. The reason of the peculiar appearance was the bright reddish color of the bracts which was characteristic of the plants all over the lot. A specimen in fruit in the herbarium of Dr. E. H. Eames of Bridgeport, Connecticut, from the well known station of Mr. Walter Deane's at Shelburne, New Hampshire, has been seen by the writer and has this same striking characteristic. In Mr. Deane's interesting articles in RHODORA no mention was made of the color of the bracts. Is this a distinctive trait of all fruiting plants of this species? The soil at the station was sandy and sterile. Owing to lack of time the station was not carefully looked over. The writer is looking forward to a visit to this place at an earlier date during the coming season.— ARTHUR E. BLEWITT, Waterbury, Connecticut.